

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-20 are presently active; Claims 3-5 having been amended, Claim 6 having been canceled without prejudice, Claims 12-20 having been added by way of the present amendment. No new matter has been added.

In the outstanding Office Action, Claims 3, 5 and 6 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 was objected to due to a typing error. Claim 1-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kitahara et al. (U.S. Pat. No. 6,121,752) in view of Nunnally (U.S. Pat. No. 5,869,200).

In light of the outstanding grounds for objection and rejection, to expedite issuance of a patent from the present application, Claims 3-5 have been amended. Also submitted herewith are new Claims 12-20 which define a varied scope of protection. No new matter has been added.

Regarding the objection to Claim 4, Claim 4 has been amended to address the typing error. Thus, it is respectfully submitted that the objection to the claims has been overcome.

Regarding the 35 U.S.C. § 112, second paragraph, rejection of Claims 3 and 5, Claim 3 and 5 have been amended to clarify the claimed matter. The changes to Claims 3 and 5 are fully supported by the specification, for example, FIG.13 and FIG.15 and their corresponding descriptions in the specification, in which only the unit fuel cell C_1 is grounded, and the other cells $C_2, C_3, \dots C_n$ are not grounded. In these examples, the protection circuit 12 (or 14) is connected to the grounded fuel cell C_1 and the protection circuits 11 comprising a level

conversion driver are connected to the fuel cells $C_2, C_3, \dots C_n$. Thus, Claims 3 and 5 are fully supported by the specification.

Further, regarding the 35 U.S.C. § 112, second paragraph, rejection of Claim 6, Claim 6 has been canceled without prejudice. Thus, it is respectfully submitted that the 35 U.S.C. § 112, second paragraph, rejection has been overcome.

Regarding the rejection of the Claims 1-11, Applicants respectfully traverse the outstanding grounds for rejection, because in Applicants' view, a prima facie case of obviousness has not been established.

In accordance with M.P.E. P. §2143, to establish a prima facie case of obviousness under 35 U. S. C. § 103 (a), the prior art reference (or references when combined) must teach or suggest all the claim limitations. Further, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

Applicants respectfully submit that a prima facie case of obviousness has not been established for the following reasons.

Firstly, Claim 1 recites a detection unit detecting abnormality of a potential difference between positive and negative electrodes of at least one fuel cell of the fuel cell stack and a bypass unit forming bypass current path between the positive and negative electrodes, the bypass unit being operative when the detection unit detects the abnormality of the potential difference.

Kitahara et al. and Nunnally fail to teach or suggest all of these limitations.

A fuel cell generally means "a cell that converts chemical energy directly into electric energy, with electric power being produced as a part of a chemical reaction between the electrolyte and a fuel such as kerosene or industrial fuel gas" (see McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition). Instead, as apparently understood from Table 1 in column 9, the cell disclosed in Nunnally uses lead, zinc, lead dioxide and metal hydride, but never use

kerosene or any industrial fuel gas. Kitahara et al. does not disclose the fuel cell battery as the outstanding Office Action stated. Thus, the fuel cell recited in Claim 1 is neither taught nor suggested by these references.

Further, the abnormality of a potential difference is a state that a measured potential difference between both electrodes of the fuel cell goes below a threshold value which is predetermined so as to detect a power generation malfunction.¹ Instead, Kitahara et al. discloses a reference charging voltage circuit 41, a charging current control circuit 42 and a charging current bypass circuit 43 as components of the charging current control circuit 40 (see column 6, lines 9-13). The charging voltage circuit 41 generates reference voltages (V1'-V2'), (V2'-V3'), (V3'-V4') and (V4'-V5') (see column 6, lines 9-13 and column 7, lines 6-14). The charging current control circuit 42 calculates output voltages on the basis of the reference voltages and terminal voltages V1, V2, V3, V4 and V5 of the cell groups 30. The output voltages are respectively shifted to operating points of MOSFETs 432a-432d included in the charging current bypass circuit 43 (see respectively column 7, lines 25-37, column 7, line 55 through column 8, line 7, and column 8, lines 36-55). In a case of the MOSFET 432b, for example, an operational amplifier 423a of the charging current control circuit 42 calculates an output voltage of $A\{(V2' - V3') - (V2 - V3)\}$ (see column 7, lines 60-62) and the output voltage is shifted to the operating point voltage of the MOSFET 432b (see column 8, lines 1-3). In the formula of $A\{(V2' - V3') - (V2 - V3)\}$, the term (V2'-V3') means the reference voltage and the term (V2-V3) means the potential difference of the cell in question. As understood from the formula, the output voltages relate to the comparisons between the respective potential differences of the cells and the reference voltages, which further relate to how close the respective potential differences come to the charging end voltages of the cells.

¹ For example, Specification at page 10, lines 11-24.

Namely, Kitahara et al. discloses a battery assembly unit for applying constant current/constant voltage charging to a battery assembly. Thus, the output voltages of the charging current control circuit 422 and 421 do not detect the abnormality of a potential difference between positive and negative electrodes of the battery cell. Therefore, although the outstanding Office Action states that the elements 422a-422c, 421a-421c in Fig. 2 of Kitahara et al. correspond to the detection unit recited in Claim 1, Kitahara et al. fails to teach or suggest a detection unit detecting abnormality of a potential difference between positive and negative electrodes of at least one fuel cell of the fuel cell stack.

In addition, Kitahara et al. fails to teach or suggest a bypass unit forming bypass current path between the positive and negative electrodes, the bypass unit being operative when the detection unit detects the abnormality of the potential difference.

Thus, since the cited references fail to teach or suggest all the claim limitations, a prima facie case of obviousness with regard to Claim 1 has not been established.

Second, the outstanding Official Action combines the disclosures of Kitahara et al. and Nunnally to reject claims 1-11. However, the teachings of Kitahara et al. and Nunnally do not provide any suggestion or motivation to modify or combine reference teachings. Kitahara et al. discloses a charging current control circuit 40 for rechargeable battery cells 30, which is provided with a charging current bypass circuit for bypassing charging current (see lines 11-15 of column 3). The charging current control circuit 40 is validated during charging operation only (see lines 44-50 of column 3). On the contrary, not only the battery cell of Nunnally but also general fuel cells are not rechargeable by applying charging current. The teachings of Kitahara et al. and Nunnally cannot be combined without changing the principle of operation of either of the inventions, of Kitahara et al. and Nunnally. In accordance with M.P.E.P. §2143.01, this situation is not sufficient to render the claims prima facie obvious. Thus, since there is no suggestion or motivation to modify the references or to combine reference teachings, Applicants respectfully submit that a

prima facie case of obviousness with regard to Claim 1 has not been established.

The same arguments set forth above apply to the rejection of independent Claims 9-11 under 35 U.S.C. § 103(a) as being unpatentable over Kitahara et al. in view of Nunnally. The remaining contested Claims 2-5, 7 and 8 dependent from Claim 1, 7, 17 and 19 are also believed to be allowable.

Consequently, in view of the present amendment and in light of the above discussions, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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